

Amendment and Response

Applicant: Hagen Klauk et al.

Serial No.: 10/599,470

Filed: November 17, 2008

Docket No.: I433.251.101/14187

Title: **SENSOR HAVING ORGANIC FIELD EFFECT TRANSISTORS**

REMARKS

The following remarks are made in response to the Non-Final Office Action mailed December 16, 2009. Claims 1-16 have been previously cancelled. Claims 17-37 were rejected. With this Response, claims 17, 18, 20-22, 25, 26, 28, 29, 31-33, and 35-37 have been amended, claim 19 has been cancelled without prejudice, and claim 38 has been added. Claims 17, 18, and 20-38 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 102

The Examiner rejected claims 17, 19, 21, 22, 34, and 36 under 35 U.S.C. § 102(b) as being anticipated by Vilkomerson, U.S. Patent No. 3,978,508 ("Vilkomerson").

Applicants submit that Vilkomerson fails to teach or suggest the limitations recited by independent claims 17 and 34 including **an organic field effect transistor**.

Vilkomerson discloses a field effect transistor comprising an N-conductive semiconductor body 12 having P-conductive source and drain zones 16 and 18, which are connected with electrodes 32 and 34, respectively. (Fig. 4). An insulating layer 26 covers the semiconductor body 12 between the source and drain zones 16 and 18 (i.e., the channel region of the field effect transistor). (Fig. 4). An elastomer layer 36 is used as a gate electrode. Elastomer layer 36 produces an electric field when a pressure is applied thereto so that electric charges are produced in the semiconductor body and especially in the channel region. (Col. 1, line 64 – col. 2, line 19).

Vilkomerson fails to disclose *an organic field effect transistor*. Vilkomerson was published in 1976. At that time, organic field effect transistors were completely unknown, as can be seen from Gilles Horowitz, "Organic Field-Effect Transistors" ("Horowitz"). Horowitz states that organic field effect transistors were first described in 1987 (i.e., eleven years after the publication date of Vilkomerson). Vilkomerson merely discloses an elastomer that produces an electric field when a pressure is applied thereto. This electric field influences a "classic" field effect transistor, not an organic field effect transistor as recited by independent claims 17 and 34.

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In addition, Applicants submit that Vilkomerson also fails to teach or suggest the additional limitations recited by amended independent claim 17 including **the organic field effect transistor comprising an active layer provided between a gate dielectric and a passivation layer and between a source electrode and a drain electrode, wherein the active layer is made of a material selected from the group consisting of pentacene, thiophene, oligothiophene, polythiophene, and fluorine**. In Vilkomerson, the active layer is made of a semiconductor material, not a material selected from the group consisting of pentacene, thiophene, oligothiophene, polythiophene, and fluorine.

In view of the above, Applicants submit that the above rejection of independent claims 17 and 34 under 35 U.S.C. § 102(b) should be withdrawn. Dependent claim 19 has been incorporated into independent claim 17, and dependent claim 19 has been cancelled. Dependent claims 21, 22, and 36 further define patentably distinct independent claim 17 or 34. Accordingly, Applicants believe that these dependent claims are also allowable over the cited references. Allowance of claims 17, 21, 22, 34, and 36 is respectfully requested.

Claim Rejections under 35 U.S.C. § 103

The Examiner rejected claims 18, 20, 35, and 37 under 35 U.S.C. § 103(a) as being unpatentable over Vilkomerson and further in view of Gilles Horowitz "Organic Field-Effect Transistors" ("Horowitz").

Dependent claims 18, 20, 35, and 37 further define patentably distinct independent claim 17 or 34. Accordingly, Applicants believe that these dependent claims are also allowable over the cited references. Allowance of claims 18, 20, 35, and 37 is respectfully requested.

In addition, Applicants submit that Vilkomerson and Horowitz, either alone, or in combination, fail to teach or suggest the further limitations recited by dependent claim 18 including **wherein the organic field effect transistor is a pentacene transistor having an active layer made of pentacene between its source electrode and its drain electrode**. The Examiner submits that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the device including a field effect transistor and active region

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36 as disclosed by Vilkomerson with the electric field producing means such as the elastomer pentacene as disclosed by Horowitz or more specifically, replace the active region 36 with a layer of pentacene.” (Office Action, page 5). Reference number 36 of Vilkomerson, however, does not refer to an *active region* as submitted by the Examiner. Rather, reference number 36 of Vilkomerson refers to a resilient, compressible, electric field producing means. (Col. 4, lines 15-16). The *active region* of Vilkomerson is channel region 24. Merely replacing element 36 of Vilkomerson with pentacene would not provide the force sensor as recited by claim 18.

The Examiner rejected claim 23 under 35 U.S.C. § 103(a) as being unpatentable over Vilkomerson and further in view of Speakman, U.S. Patent Application Publication No. 2002/0105080 (“Speakman”).

Applicants submit that Vilkomerson and Speakman, either alone, or in combination, fail to teach or suggest the limitations recited by independent claim 23 including **an organic field effect transistor applied on the substrate; and where the substrate is configured as a deformable diaphragm and the measurement quantity corresponding to the bending state of the diaphragm.**

As discussed above with reference to independent claims 17 and 34, Vilkomerson fails to disclose *an organic field effect transistor*. In addition, the Examiner admits that Vilkomerson is silent with respect to where the substrate is configured as a deformable diaphragm and the measurement quantity corresponding to the bending state of the diaphragm. The Examiner submits that Speakman discloses this claim limitation. (Office Action, page 7).

Speakman teaches away from a combination with Vilkomerson. Vilkomerson is directed to a semiconductor device fabricated by photolithographic techniques, chemical vapor deposition, oxidation, masking, and dopant diffusion. (See col. 1, line 33 – col. 4, line 5). Speakman specifically discloses that photolithography, chemical vapor deposition, oxidation, masking, and dopant diffusion make the manufacturing process slow and are difficult to accurately control, which can lead to loss in accuracy in the shape and performance of the finished product. (See. para. [0007]-[0015]).

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In addition, the combination of the flexible substrate of Speakman for the substrate in Vilkomerson would render the device of Vilkomerson inoperable. The flexible substrate of Speakman cannot be doped to provide a field effect transistor comprising an N-conductive semiconductor body having P-conductive source and drain zones as required by Vilkomerson. Even if Speakman could be combined with Vilkomerson, the combination would necessarily change the principle of operation of Vilkomerson, which relies on providing an electric field in the channel region 24 of the field effect transistor based on the electric field producing means 36. Vilkomerson does not provide a measurement quantity corresponding to the bending state of the substrate. Therefore, one of ordinary skill in the art would not be motivated to combine the flexible substrate disclosed by Speakman with the pressure sensitive field effect device disclosed by Vilkomerson to provide the pressure sensor recited by claim 23.

In view of the above, Applicants submit that the above rejection of independent claim 23 under 35 U.S.C. § 103(a) should be withdrawn. Allowance of claim 23 is respectfully requested.

The Examiner rejected claims 24 and 25 under 35 U.S.C. § 103(a) as being unpatentable over Vilkomerson, and further in view of Yaniv et al., U.S. Patent No. 4,827,085 ("Yaniv").

Applicants submit that Vilkomerson and Yaniv, either alone, or in combination, fail to teach or suggest the limitations recited by independent claim 24 including **an organic field effect transistor**.

As discussed above with reference to independent claims 17 and 34, Vilkomerson fails to disclose *an organic field effect transistor*. In addition, Yaniv merely discloses in Figure 4 a touch sensor wherein sensor elements are provided at crossing points of electric lines that are perpendicular to each other. The sensor elements include resistance means and not *organic field effect transistors*.

In view of the above, Applicants submit that the above rejection of independent claim 24 under 35 U.S.C. § 103(a) should be withdrawn. Dependent claim 25 further defines patentably distinct independent claim 24. Accordingly, Applicants believe that this dependent claim is also allowable over the cited references. Allowance of claims 24 and 25 is respectfully requested.

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The Examiner rejected claims 26 and 27 under 35 U.S.C. § 103(a) as being unpatentable over Vilkomerson and Yaniv, and further in view of Mehta et al., U.S. Patent No. 3,795,898 ("Mehta").

Dependent claims 26 and 27 further define patentably distinct independent claim 17 or 24. Accordingly, Applicants believe that these dependent claims are also allowable over the cited references. Allowance of claims 26 and 27 is respectfully requested. In addition, Mehta discloses semiconductor memory devices having row and column decoding means. Mehta has nothing to do with organic field effect transistors and force or pressure sensors.

The Examiner rejected claims 28 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Vilkomerson in view of Yaniv and Mehta as applied to claim 27 above, and further in view of Thompson, U.S. Patent Application Publication No. 2006/0138599 ("Thompson").

Dependent claims 28 and 29 further define patentably distinct independent claim 17. Accordingly, Applicants believe that these dependent claims are also allowable over the cited references. Allowance of claims 28 and 29 is respectfully requested.

The Examiner rejected claim 30 under 35 U.S.C. § 103(a) as being unpatentable over Vilkomerson in view of Yaniv, Mehta, and Thompson as applied to claim 29 above and further in view of S.T. Cui, "Intermolecular potentials and vapor-liquid phase equilibria of perfluorinated alkanes" ("Cui").

Dependent claim 30 further defines patentably distinct independent claim 17. Accordingly, Applicants believe that this dependent claim is also allowable over the cited references. Allowance of claim 30 is respectfully requested.

The Examiner rejected claims 31-33 under 35 U.S.C. § 103(a) as being unpatentable over Vilkomerson in view of Yaniv, Mehta, Thompson, and Cui as applied to claim 28 above and further in view of Reamey et al., U.S. Patent No. 5,543,944 ("Reamey").

Dependent claims 31-33 further define patentably distinct independent claim 17. Accordingly, Applicants believe that these dependent claims are also allowable over the cited references. Allowance of claims 31-33 is respectfully requested.

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Added Claim

Claim 38 has been added. No new matter has been added. Applicants believe that added claim 38 is allowable over the cited references. Allowance of claim 38 is respectfully requested.

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CONCLUSION

In view of the above, Applicants respectfully submit that pending claims 17, 18, and 20-38 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 17, 18, and 20-38 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(h)(i). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicants' representative at the below-listed telephone numbers to facilitate prosecution of this application.

Any inquiry regarding this Amendment and Response should be directed to Steven E. Dicke at Telephone No. (612) 573-2002, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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Respectfully submitted,

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